

Q15



Perfectly elastic -  $P$  and  $E_k$  are conserved

$$\sum P_i = \sum P_f$$

$$m_B v_{Bf} + m_S v_{Sf} = m_B v_{Bi} + m_S v_{Si}$$

$$\sum E_{ki} = \sum E_{kf} \leftarrow \text{elastic collision}$$

$$\frac{1}{2} m_B v_{Bf}^2 + 0 = \frac{1}{2} m_B v_{Bi}^2 + \frac{1}{2} m_S v_{Sf}^2$$

$$(835)^2 = x^2 + \frac{104}{0.0042} y^2$$

$$835 = x + \frac{104}{0.0042} y$$

$$x = 835 - \frac{104}{0.0042} y$$

$$0.25^2 - 1020 \cdot 104 \cdot 2$$

$$835^2 = \left(835 - \frac{104y}{0.0042}\right)^2 + \frac{104}{0.0042} y^2$$

$$\cancel{835^2} = \cancel{835^2} - 2(835)\left(\frac{104}{0.0042}\right)y + \left(\frac{104}{0.0042}y\right)^2 + \frac{104}{0.0042}y^2$$

$$0 = ay + by^2 + cy^2$$

$$0 = -2(835) + \frac{104}{0.0042}y + y$$

$$1670 = 24762.9y$$

$$y = 0.067 \text{ m/s}$$

Q16 - P is conserved in collision

$E_k \rightarrow E_y$  in swing

p239 Q31